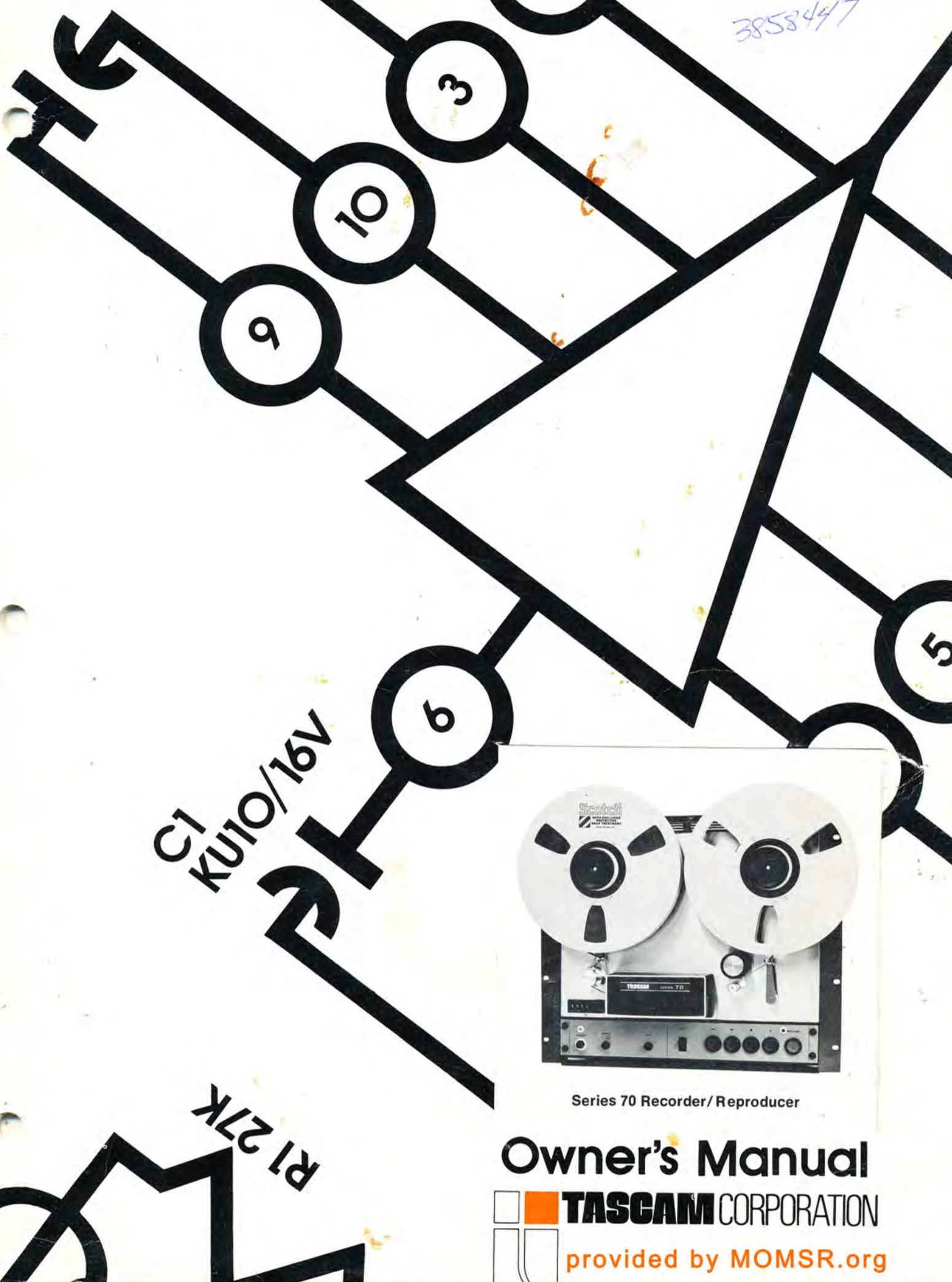


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R1 27K



Series 70 Recorder/Reproducer

Owner's Manual

 **TASCAM** CORPORATION

provided by MOMSR.org

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701 Electronics



501 Electronics



Series 70 Recorder/Reproducer

provided by MOMSR.org

ABOUT THE SERIES 70

Recorder/reproducers traditionally have fallen into two categories: consumer or professional. Between high-end consumer audio products and full professional studio equipment the serious recordist had few choices. You bought a motorbike or a limousine, basic transportation or the ultimate trip.

The TASCAM Series 70 was designed to fill that void. We think it's a tremendous price/performance breakthrough. But to achieve that breakthrough and to provide a high degree of quality and reliability, we had to look beyond the Series 70 itself. We had to take into account and make some assumptions about the people who were going to use it. You.

To get the most out of the Series 70 you have to know how to drive it. It's a creative tool. Simply put, if you're as good as we think you are, and the rest of your equipment is as good as the Series 70, you can get master-quality tapes.

ABOUT THE SERIES 70 MANUAL

Like the Series 70 itself, this manual presumes a certain technical knowledge on your part — that you know fundamentally what a tape recorder is, what it can do, and how to operate one. The purpose of the manual, then, is to acquaint you with the locations of the controls, connectors, jacks

and plugs of this particular recorder. So the block diagrams and the schematics provide basic functional information.

Also included in this manual is a section on minor calibrations and adjustments. We realize the typical Series 70 owner considers this to be part of routine maintenance, and that he has — or has access to — the necessary technical know-how and equipment. Please note, however, that we can't sanction your taking the initiative to service or modify the recorder. We've taken a lot of time and effort to find dealers who can and will do that sort of thing. So if you suspect something is functionally wrong call your dealer immediately. Otherwise you run the risk of voiding the warranty.

ABOUT THE SERIES 70 WARRANTY

In a non-legal nutshell, you have 90 days free service and 1 year free parts. But, remember that the Series 70 warranty is a legal document which spells out mutual responsibilities — yours and ours — in the unfortunate event something goes wrong with your tape recorder and it's our fault. Before you do anything else you should read and understand the Warranty. See where it says you have to send us the gold copy of the Warranty Agreement within ten days of purchase? Do it now. Later may be too late.

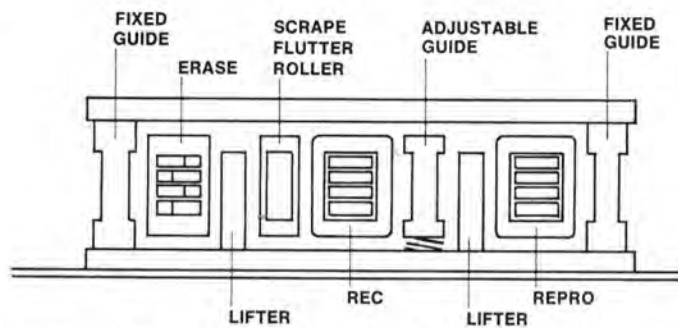
SERIES 70 TRANSPORT CONTROLS

1. Four-place DIGITAL COUNTER with reset button.
2. PILOT LIGHT. Illuminates when power button is depressed.
3. POWER. Energizes the recorder in the depressed position.
4. SPEED SELECT. The released position (HIGH) is normally 15 ips, depressed (LOW) position is normally 7½ ips. The Series 70 is a two speed transport in which the standard speed selections are 15—7½ or 7½—3¾.
5. EDIT. In the depressed position the edit button inhibits the actions of the take-up reel motor and tape shut-off switch, but does not affect the supply-reel motor, capstan motor, lifters and pinch roller. Thus, when the edit function is engaged and the transport is in PLAY, the Series 70 is in "Wastebasket" mode.
6. In the up (engaged) position the CUE lever defeats the right tape lifter allowing the tape to come in contact with the reproduce head. When

cue is engaged you can manually rotate the reels to locate the exact point for splicing. In Fast forward or Rewind you can quickly locate the beginning or end of program material.

7. Left to right as you face the transport, the solenoid/relay touchbutton controls are rewind, fast forward, stop, play and record (with indicator light). To record, RDY must first be selected on the appropriate channels (See Pages 4, 6). RECORD can be entered from stop or play. To record from stop, depress play and record simultaneously, or play then record.

The spill-proof logic circuit is equipped with plug-in relays. When play is entered from fast forward or rewind after a 0 to 2 second time lapse, there is a delay of approximately ½ second. When play is entered from fast forward or rewind after a 3-second or more time lapse, there is a fixed delay of approximately 6 seconds for ¼" tape transports — approximately 8 seconds for ½" tape transports. These time delays are factory set, and they may be adjusted or defeated altogether.



as you wish, but see your dealer for the appropriate adjustment.

The following controls maintain constant tape tension and smooth, even tape travel:

8. COMPLIANCE ARM and tape guide.

9. HIGH INERTIA FLUTTER FILTER. Compensates for erratic movements of the tape off the supply reel due to haphazard windings, improper splicings, etc.

10. SCRAPE FLUTTER ROLLER. A low-friction roller located just prior to the record head to reduce flutter caused by so-called "stiction." (See 16)

11. PINCH ROLLER.

12. Centerless ground CAPSTAN SHAFT with massive flywheel hysteresis-synchronous motor, indirect drive.

13. Automatic SHUT-OFF ARM with tape guide and threading guide. Disengaged, the power for mechanical functions of the transport is shut off without affecting the power supply to the

electronics.

14. and 15. TURNTABLES and spindle assemblies independently driven by two heavy duty 6-pole constant torque motors. Reel locks are standard equipment. They take a little getting used to, so for openers:

1. Rotate the knob mechanism in an extreme counter-clockwise position; 2. Locate the hub adaptor snugly against the reel; 3. Make sure that the brass collet is both properly hubbed and securely located over the spindle.

16. Plug-in HEAD NEST (Erase, Record, Reproduce — See Drawing). Note that this feature is intended more for serviceability than for quick track format conversions in the field. There is a message here that has everything to do with our design philosophy and the end cost of the product to you, especially with regard to conversion between 1/2-inch and 1/4-inch transports. In short, it is not recommended. In fast forward or rewind the two TAPE LIFTERS keep the tape away from the heads to prevent undue wear. (See Cue)



MODEL 701 ELECTRONICS CONTROLS

1. METERS. For nominal reference. 0 indicates optimum record level and, in the reproduce mode, corresponds to -10 db out.
2. MONITOR SWITCH. Allows for monitoring of either the record or reproduce level. Independent controls, meters are switched accordingly.
3. RECORD. Normally used for calibrations and pre-settings, as well as meter and loudspeaker/headphone monitoring during recordings.
4. PLAYBACK. For meter and loudspeaker/headphone monitoring during playback. NOTE: The Model 701 Electronics do not have built-in provisions for headphone monitoring, hence you will have to outboard your own device if such an application appears necessary.

MODEL 703 OVERDUB UNIT

(also contains the bias oscillator)

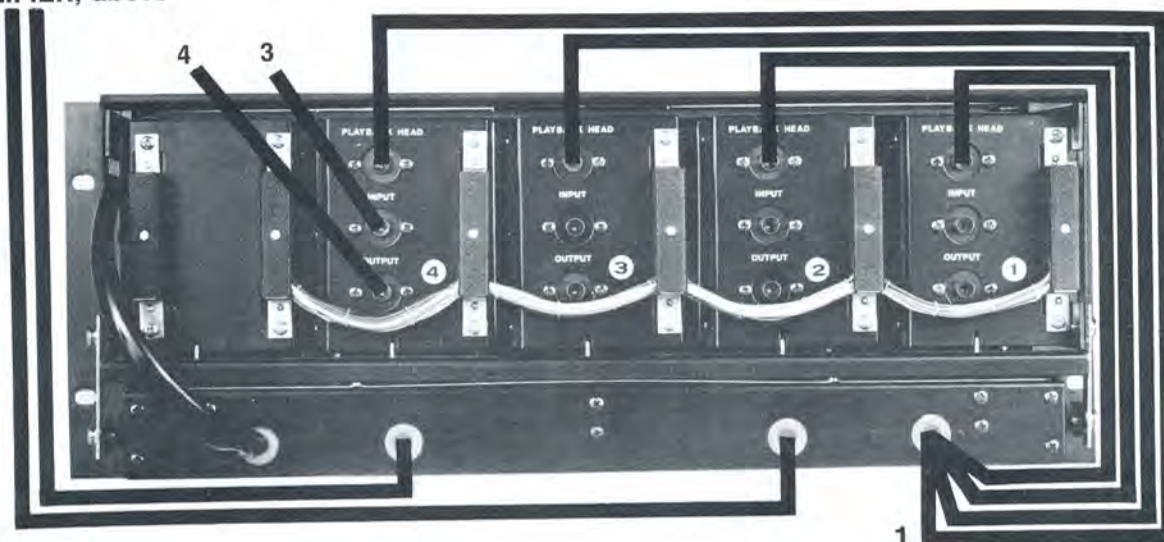
5. MODE SELECTOR. A 3-position control: RDY (Ready) with indicator light programs the recorder to enter the record mode when the record button on the transport is depressed. This is the only position in which the record mode may be entered. SAFE is the normal position for reproduce monitoring. The SYNC position is for monitoring in an overdub situation. Sync temporarily assigns a recorded signal on that track to the record head instead of the reproduce head.

6. MODEL 702 POWER SUPPLY.



From 703 Panel, below

2
To AMPLIFIER, above



CONNECTIONS AND INTERCONNECTIONS — 701 ELECTRONICS

1. Check the connections of the captive cables from the rear apron of the 703 panel to the 701 inputs marked PLAYBACK HEAD. The shortest lead should be connected to the nearest input, the next shortest to the next nearest, and so on.
2. Make sure that the 16-pin (male) and the 24-pin (female) captive cables from the rear apron of the 703 panel are connected to the corresponding connectors marked AMPLIFIER on the transport.
3. INPUT. For line level sources. (See specifications, page 25)
4. OUTPUT. Nominal .3 v into 10k Ohms or higher. (See specifications, page 25)
5. REMOTE. Socket for use with TASCAM remote transport control accessories.

6. FUSE. 2 Amps.

7. GND (Ground). Common grounding point for the Series 70, as required. If you're confronted with hum or RF problems when system connections are completed, take this grounding point and experiment with different terminations such as a cold water pipe, other chassis, etc. While we cannot make the claim that the Series 70 is absolutely RF-proof, we do know that it works satisfactorily even in relatively dense RF fields. If you do have RF problems it may be because of interconnection errors, lack of proper system ground, or the RF field may be too potent.

8. AC Power In. It is best to make all connections and interconnections before plugging into the local electric company.



LOCATION OF CONTROLS — 501 ELECTRONICS

1. MODE SELECTOR. SYNC is for monitoring in an overdub situation. Temporarily assigns a recorded signal on that channel to the record head instead of the reproduce head. SAFE is the normal position for reproduce monitoring. RDY (Ready) with Record Indicator Light programs the electronics to enter record when the record button on the transport is depressed.

2. METERS. For nominal reference. 0 indicates the optimum record level, and corresponds to +4 dBm in reproduce.

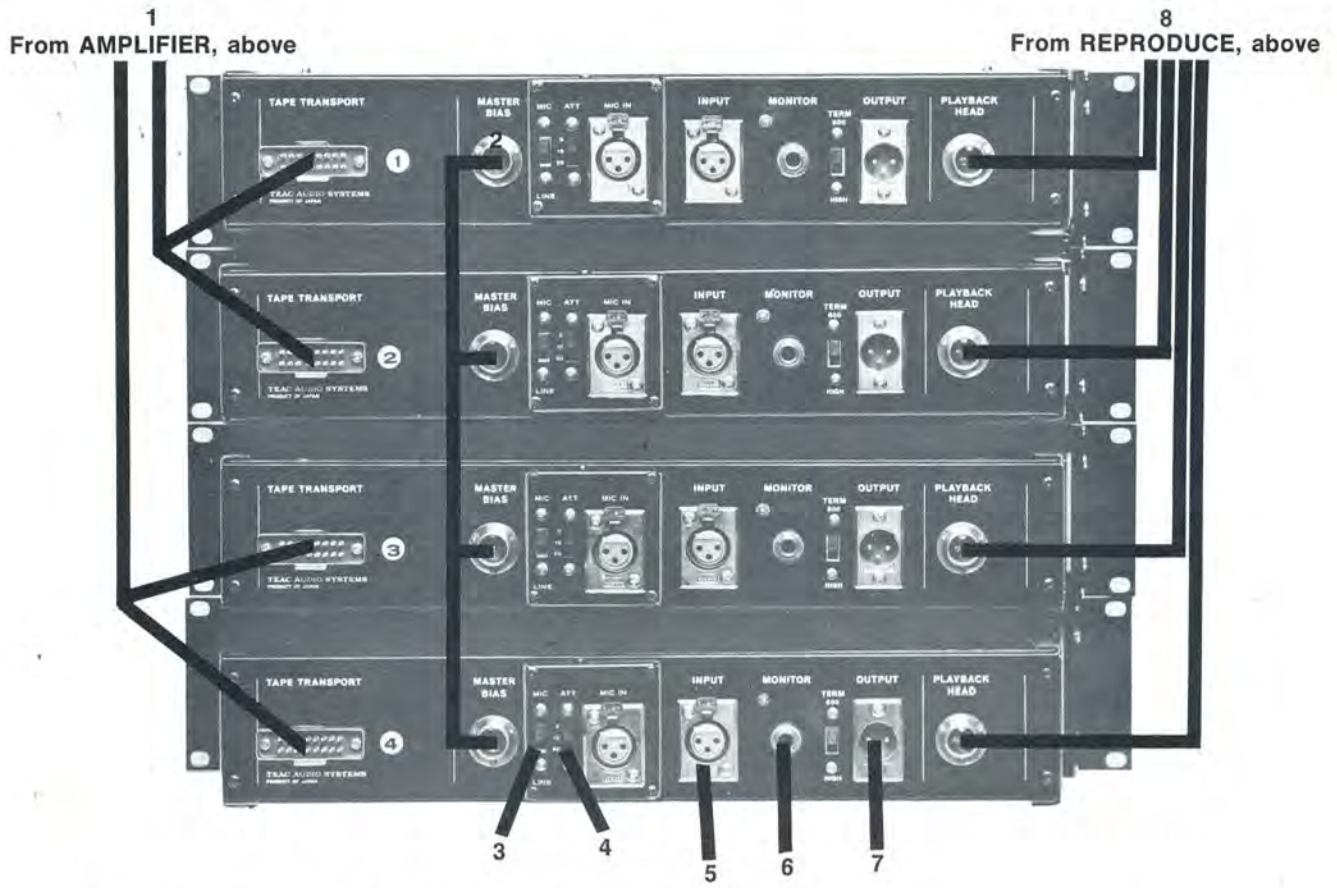
3. MONITOR. The Record position is normally used for calibrations and pre-settings as well as

for meter and loudspeaker/headphone monitoring. The Reproduce position is for meter and loudspeaker/headphone monitoring during playback.

4. RECORD LEVEL CONTROL. Continuously variable from the rated input sensitivity to zero. (See specifications, page 25)

5. REPRODUCE LEVEL CONTROL. Continuously variable from the rated output level to zero. (See specifications, page 25)

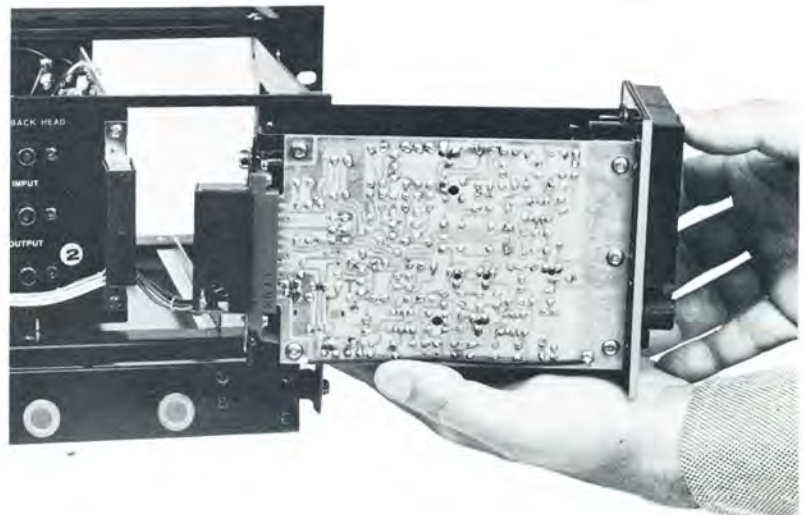
6. PHONES. For headphone monitoring. 3-circuit phone jack, balanced 600 Ohms.



CONNECTIONS AND INTERCONNECTIONS – 501 ELECTRONICS

1. Secure the multi-pin connectors to the receptacles marked AMPLIFIER on the transport, then make the appropriate connections to the receptacles marked TAPE TRANSPORT on the electronics.
2. MASTER BIAS. Connect the 1-pin cable (with threaded locking ring connector) between or among the sets of electronics. This connector is not needed in the case of a single channel configuration. The bias oscillator is in the electronics numbered 1 – the other or others contain a bias amplifier only. It is important to remember where the bias oscillator is in the event that you make conversions from 2-channel to single-channel and back, for example.
3. INPUT SELECTOR SWITCH for mic or line.

4. MIC IN with a 3-position switch for 0, 10, or 20 dB of attenuation (pad at mic pre-amp). Nominal 200 Ohms, XL connector. (See specifications, page 25)
5. Line INPUT. Nominal 600 Ohms, XL connector. (See specifications, page 25)
6. MONITOR. Standard 2-circuit phone jack, 10K Ohms, unbalanced.
7. +4 dBm (adjustable) OUTPUT with a 2-position switch for low or high impedance (bridging) loads, XL connector. (See specifications, page 25)
8. PLAYBACK HEAD. Connect the captive cables marked REPRODUCE from the rear apron of the transport to the 2-pin connector marked PLAYBACK HEAD on the electronics. These connectors have threaded locking rings.



2 = 3

MINOR CALIBRATIONS AND ADJUSTMENTS — 701 ELECTRONICS

We assume you'll be performing routine maintenance (cleaning and demagnetizing heads, guides, etc.) as a matter of course. Calibrations and adjustments, however, require certain technical qualifications and equipment. If you don't have an audio oscillator, VTVM, audio voltmeter, etc., see your service technician or contact your dealer.

The only disassembly of the Series 70 with 701 Electronics we sanction is for minor calibrations and adjustments, and only to this extent:

1. Disconnect all cables.
2. Remove the two black screws on the front plate of the 701 module.
3. Unplug the module and remove it from the front. But be careful. There's a PC connector and plug inside.
4. Remove the two screws from the back plate (shown in photo) and pivot the connector.

5. Reconnect the module from the rear making sure all cable connections are secure. Extender cards are not necessary. **IMPORTANT:** Do not attempt to remove the PC card from the module housing.

6. Remove the two screws from the back plate of the 702 power supply module (shown in photo).

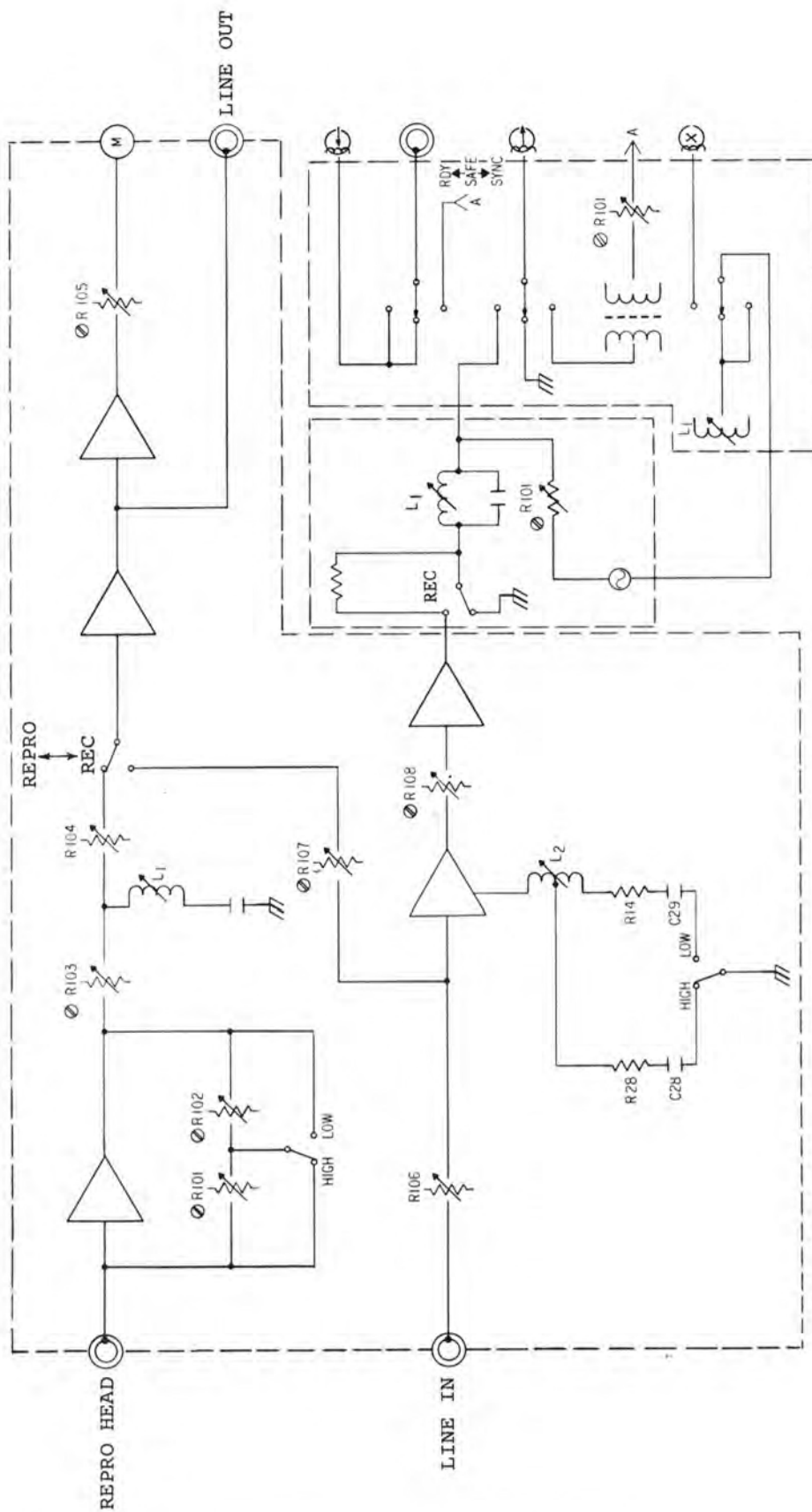
7. Remove the four side mounting screws (two on each side) on the 703 overdub unit (See photo).

8. Remove the 703 from the frame.

9. Remove the top plate of the 703.

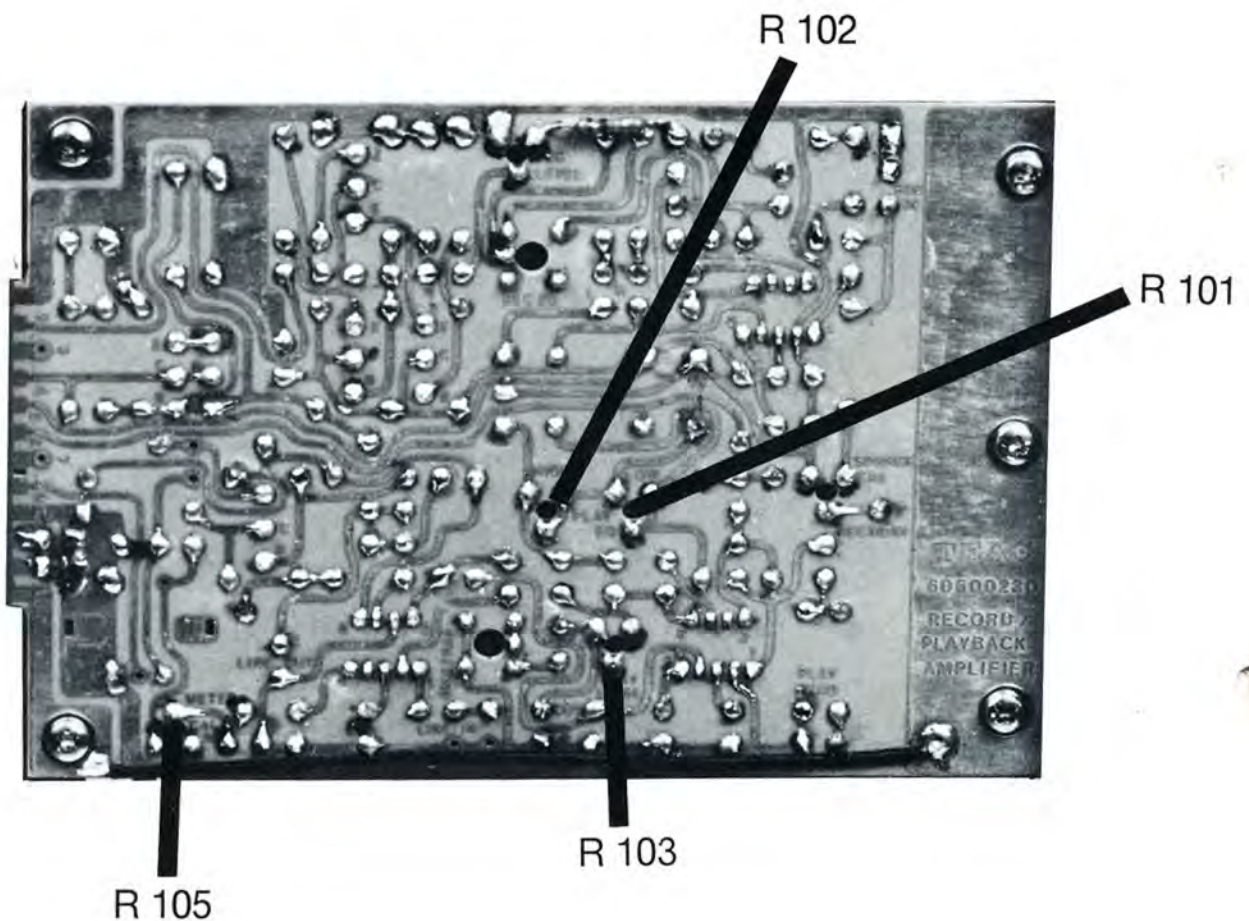
10. Reconnect the 703 from the rear, making sure the PC connector and all cable connections are secure.

NOTE: If the service you require cannot be done at this point, contact your dealer immediately or you run the risk of voiding the warranty.



701 ELECTRONICS SIMPLIFIED SCHEMATIC

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REPRODUCE LEVEL SET

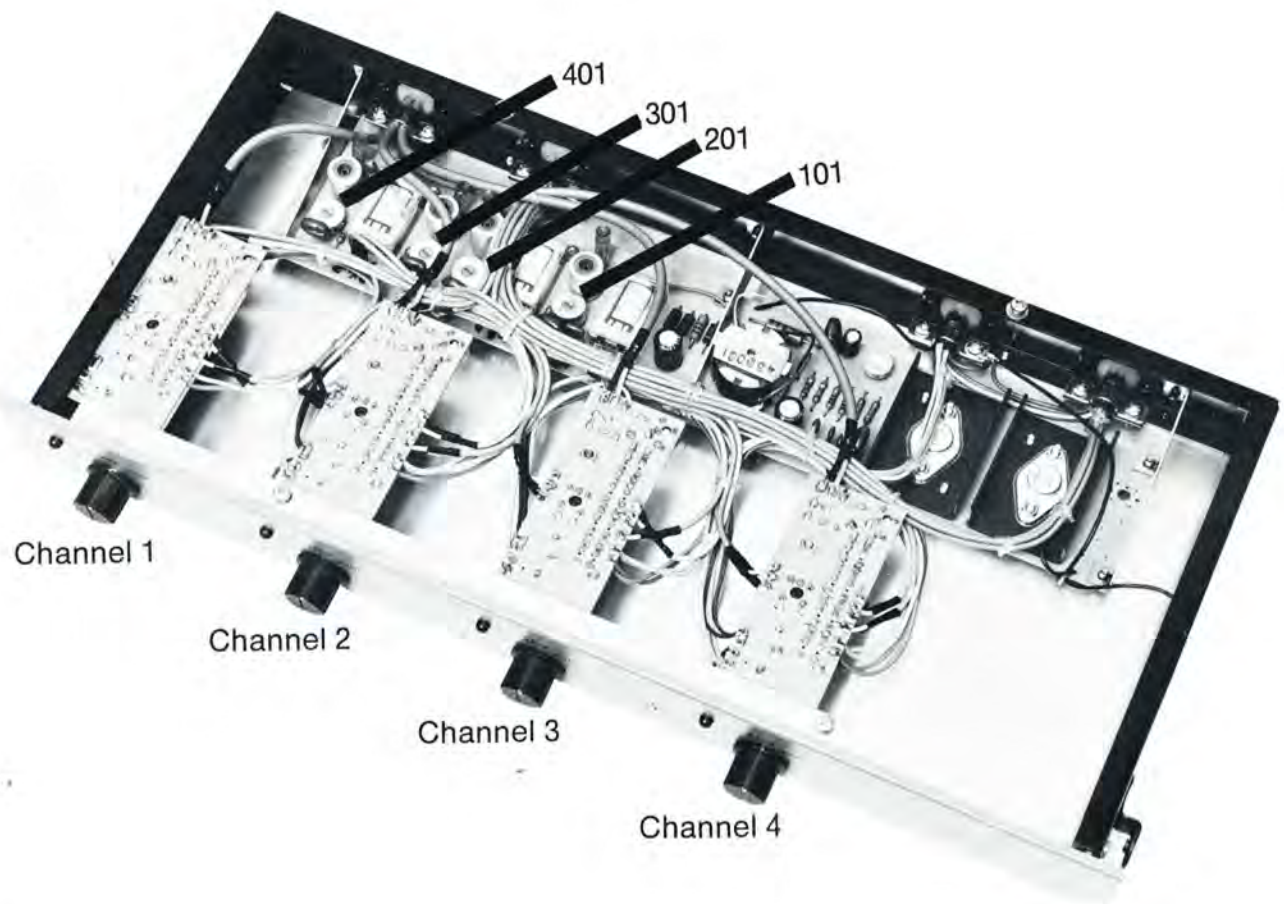
1. Connect a VTVM to the OUTPUT jack of a given channel.
2. Play a 400 Hz/500 Hz tone from the standard operating level section of a test tape.
3. Turn the PLAYBACK level control of that channel to a nominal 2-o'clock setting.
4. Adjust R 103 for a -10 dB reading on the level meter. You have now reached the specified output level set. Do not change this setting until the remaining adjustments have been completed.

NOTE: It may be necessary to adjust R 105 if the meter for that channel does not read 0 after Step 4.

5. Repeat this procedure for each remaining channel.

REPRODUCE RESPONSE

1. Connect a VTVM to the OUTPUT jack of a given channel.
2. Play a standard frequency response test tape and compare the VTVM readings on the level meter with the response limits stated in the specifications.
3. If adjustment is required, adjust R 102 for 15 ips, and R 101 for $7\frac{1}{2}$ ips. Adjust these playback EQ trimmers for the most even meter readings above 10 kHz, bringing them as close as possible to the reference frequency.
4. Repeat this procedure for each remaining channel.



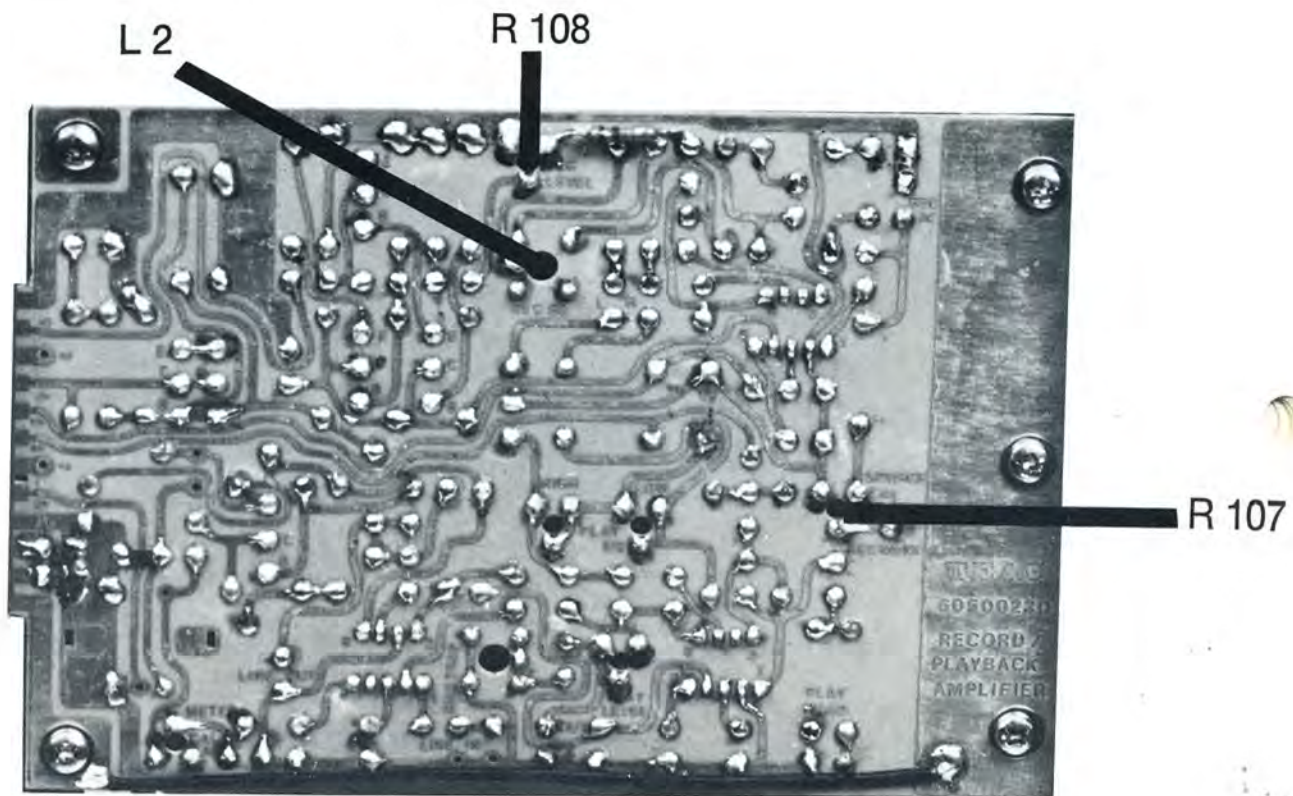
BIAS

Optimum recording performance (bias levels, recording levels and frequency response) is dependent upon tape characteristics. TASCAM Series 70 Recorder/reproducers are factory adjusted for 3M #206 tape unless otherwise specified.

Since the bias trap keeps the bias signal from reaching the record and monitor amplifier, under normal no-signal conditions there should be a minimum output reading on the VTVM. If you suspect your recorder needs a bias trap adjustment, contact your dealer.

RECORD BIAS ADJUSTMENT

1. Connect an audio oscillator to the line INPUT of a given channel and a VTVM to the corresponding OUTPUT.
2. Set the monitor switch to PLAYBACK and the tape speed to 15 ips.
3. Thread a reel of blank tape and energize all record channels.
4. While recording a 500 Hz tone, rotate the bias adjust control R 101 (201) (301) (401) counterclockwise until a peak reading is registered on the VTVM.
5. Continue rotating this control counterclockwise beyond the peak reading until the audio decreases by 0.5 dB.
6. Repeat this procedure for each remaining channel.



RECORD LEVEL ADJUSTMENT

1. Connect an audio oscillator to the line INPUT of a given channel and a VTVM to the corresponding OUTPUT.
2. Apply a 400 Hz signal at .3 V (−10 dB).
3. Set the monitor switch to RECORD and turn the record level to a nominal 2-o'clock setting.
4. Adjust R 108 to obtain the specified output level

of −10 dB at the OUTPUT jack.

NOTE: It may be necessary to adjust R 107 if the meter for that channel does not read 0 after Step 4.

5. Repeat this procedure for each remaining channel.

OVERALL FREQUENCY RESPONSE

1. Connect an audio oscillator to the line INPUT of a given channel and a VTVM to the corresponding OUTPUT.
2. Thread a reel of blank tape.
3. Adjust the oscillator to obtain an output level of -25 dB at the OUTPUT jack. To avoid tape saturation this level is approximately 15 dB below the specified output level.
4. Apply a signal swept from 40 Hz to 18 kHz and record it on the blank tape at 15 ips, then record a signal swept from 40 Hz to 15 kHz at $7\frac{1}{2}$ ips and refer to the response limits indicated in the specifications.
5. If record EQ adjustment is required, adjust L 2 by rotating the center core up or down for the most even VTVM readings above 10 kHz. Bring them as close as possible to the reference frequency, keeping in mind the reproduce response limits previously calibrated. NOTE: If more extended EQ adjustments appear necessary, contact your dealer.
6. Repeat this procedure for each remaining channel.

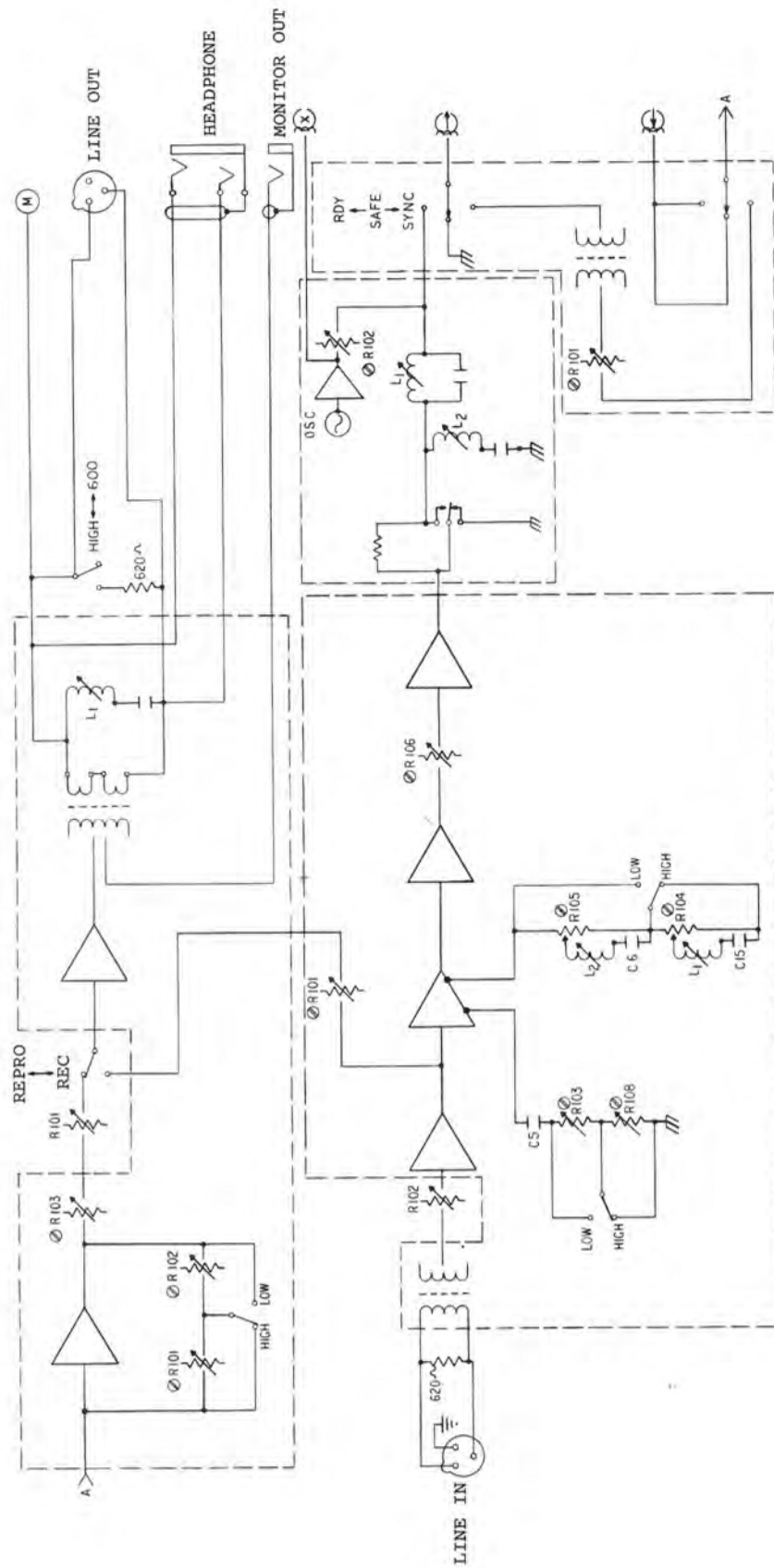


MINOR CALIBRATIONS AND ADJUSTMENTS — 501 ELECTRONICS

We assume you'll be performing routine maintenance (cleaning, demagnetizing heads, guides, etc.) as a matter of course. Calibrations and adjustments, however, require certain technical qualifications and equipment. If you don't have an audio oscillator, VTVM, audio voltmeter, etc., see your service technician or contact your dealer. The only disassembly of the Series 70 with 501 Electronics we sanction is for minor calibrations and adjustments, and only to this extent:

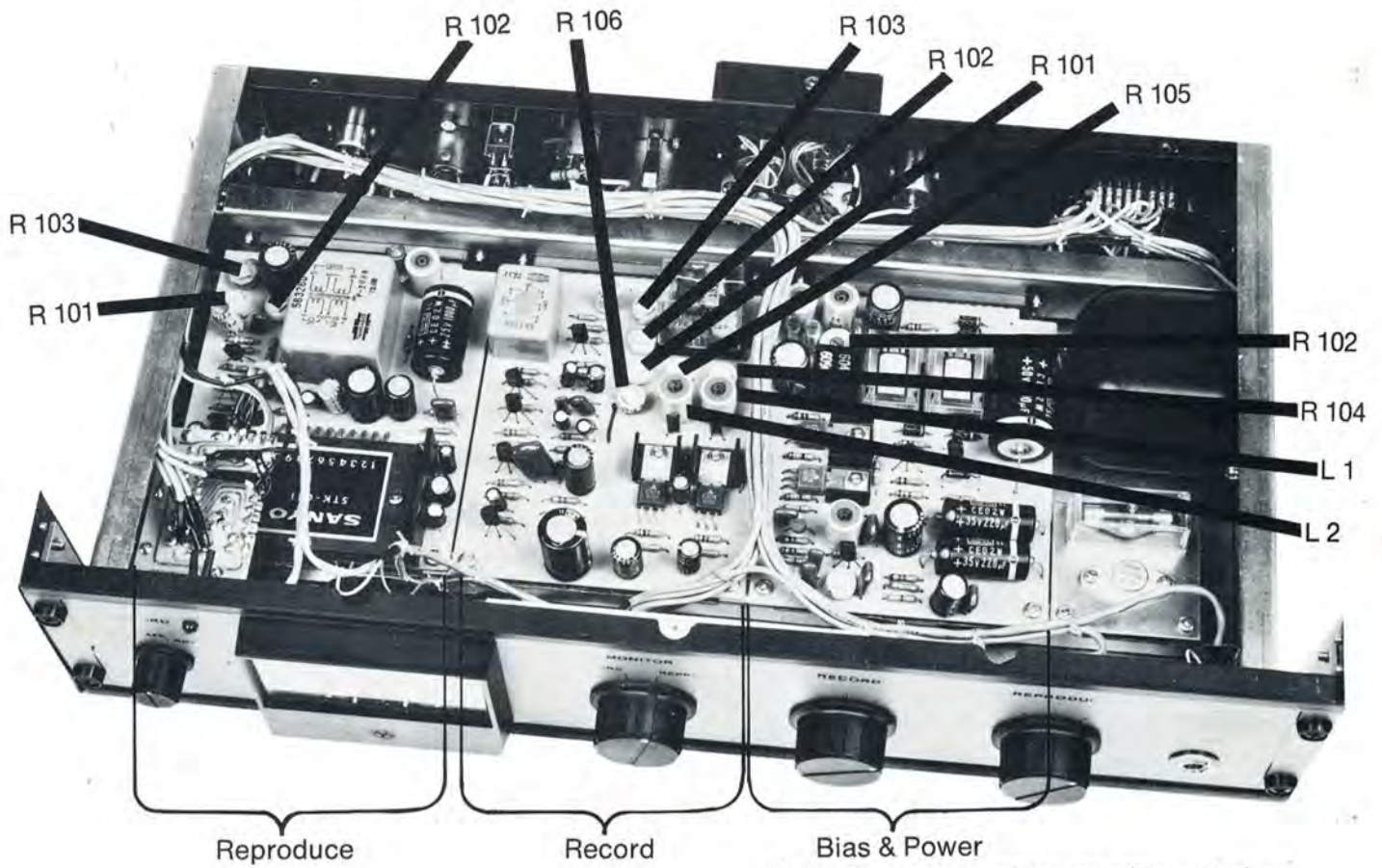
1. Disconnect all cables.
2. Remove the three mounting screws from the top plate of the electronics and slide the plate off.
3. Reconnect all cables.
4. Do not attempt to remove the plug-in PC cards.

NOTE: If the service you require cannot be done at this point, contact your dealer immediately or you run the risk of voiding the warranty.



501 ELECTRONICS SIMPLIFIED SCHEMATIC

provided by MOMSR.org



NOTE: Reference numbers are arbitrary designations only. When making an adjustment (R 102, for example), be sure you're in the proper section of the electronics.

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REPRODUCE LEVEL SET

1. Connect a VTVM to the OUTPUT connector of a given channel.
2. Play a 400 Hz/500 Hz tone from the standard operating level section of a test tape.
3. Turn the REPRODUCE level control of that channel to a nominal 2-o'clock setting.
4. Adjust R 103 for a +4 dBm reading on the level meter. This is the specified output level set. Don't change this setting until the remaining adjustments have been completed. NOTE: If the meter does not read 0 after Step 4, contact your dealer for assistance.
5. Repeat this procedure for each channel.

REPRODUCE RESPONSE

1. Connect a VTVM to the OUTPUT connector of a given channel.
2. Play a standard frequency response test tape and compare the readings on the level meter with the response limits stated in the specifications.
3. If adjustment is required, adjust R 101 for 15 ips and R 102 for 7½ ips. Adjust these reproduce EQ trimmers for the most even meter readings above 10 kHz, bringing them as close as possible to the reference frequency.
4. Repeat this procedure for each of the remaining channels.

BIAS

Optimum recording performance (bias levels, recording levels and frequency response) is dependent upon tape characteristics. TASCAM Series 70 Recorder/reproducers are factory adjusted for 3M #206 tape unless otherwise specified.

Since the bias trap keeps the bias signal from reaching the record and monitor amplifier, under normal no-signal conditions there should be a minimum output reading on the VTVM. If you suspect your recorder needs a bias trap adjustment, contact your dealer.

Remember that the bias oscillator is located in the electronics marked 1, and that the other electronics contain a bias amplifier only.

RECORD BIAS ADJUSTMENTS

1. Connect an audio oscillator to the line INPUT of a given channel and a VTVM to the corresponding output.
2. Set the monitor switch to REPRODUCE and the tape speed to 15 ips.
3. Thread a reel of tape and energize all record channels.

4. While recording a 500 Hz tone, advance the bias adjust control R 102 counterclockwise for the appropriate channel until a peak reading is registered on the VTVM.

5. Continue rotating this control counterclockwise beyond the peak reading until the audio decreases by 0.5 dB.

6. Repeat this procedure for each remaining channel.

RECORD LEVEL ADJUSTMENT

1. Connect an audio oscillator to the line INPUT jack of a given channel and a VTVM to the corresponding output.

2. Apply a 400 Hz signal at +4 dBm.

3. Place the monitor switch in the RECORD position and turn the record level control to a nominal 2-o'clock setting.

4. Adjust R 106 to obtain the specified output level of +4 dBm.

5. While in record mode, switch the monitor control between RECORD and REPRODUCE and check to make sure the meter registers 0 in both cases. If it doesn't, adjust R 101.

6. Repeat this procedure for each remaining channel.

OVERALL FREQUENCY RESPONSE

1. Connect an audio oscillator to the line INPUT of a given channel, and a VTVM to the corresponding OUTPUT.

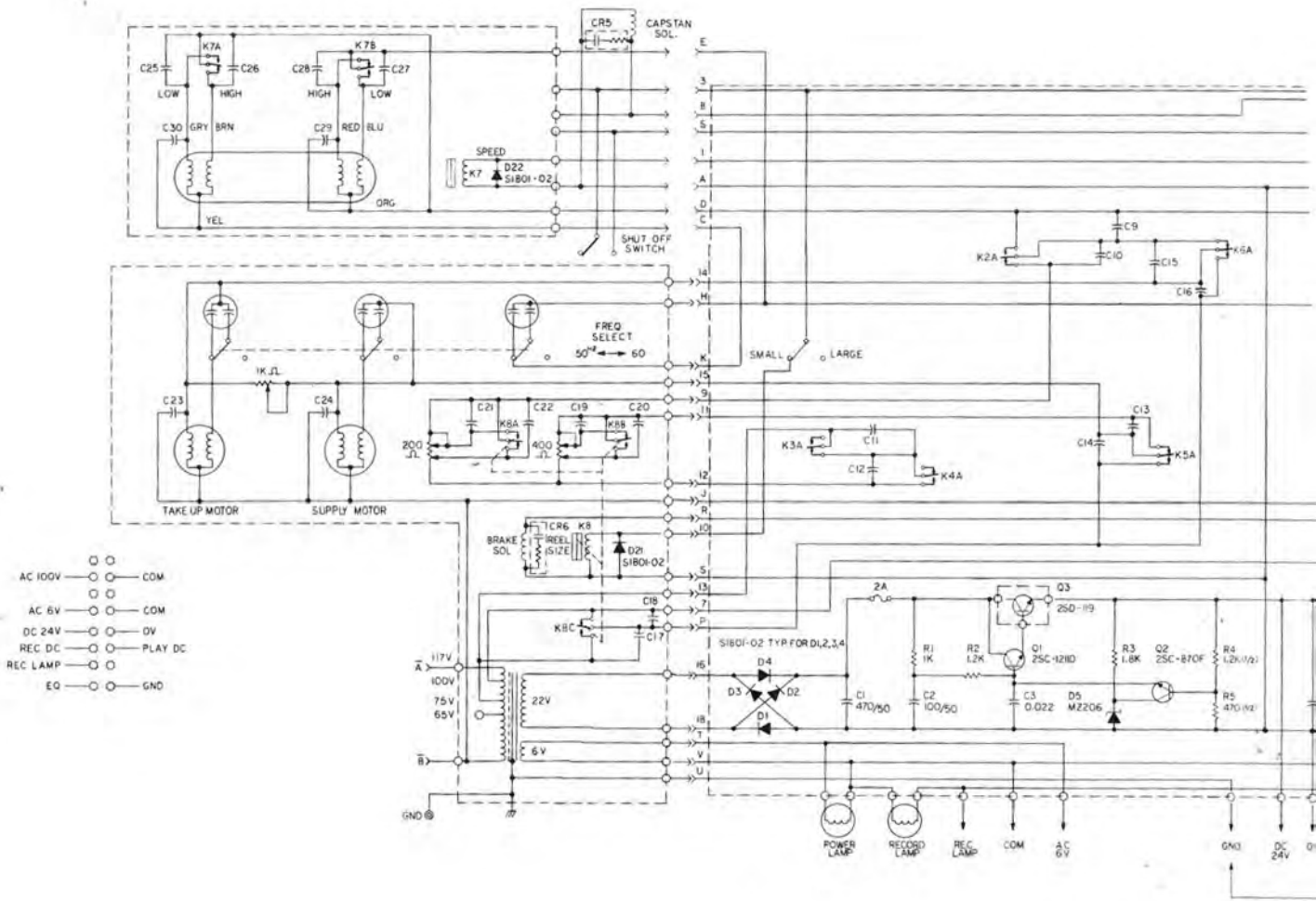
2. Thread a reel of blank tape.

3. Adjust the oscillator to obtain an output of -11 dB at the OUTPUT connector. To avoid tape saturation this level is approximately 15 dB below the specified output level.

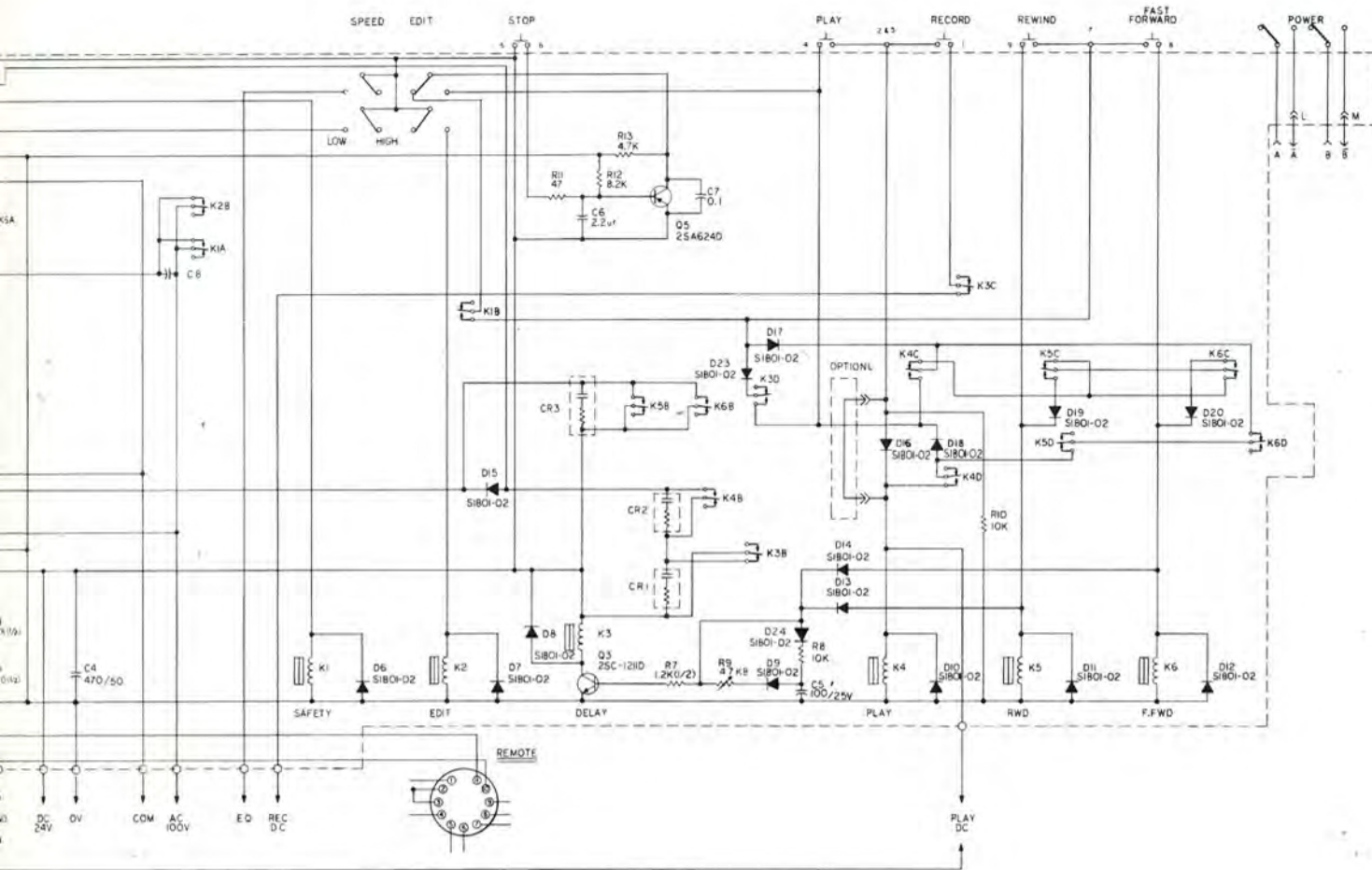
4. Apply a signal swept from 40 Hz to 18 kHz and record it on the blank tape at 15 ips, then record a signal swept from 40 Hz to 15 kHz at 7½ ips and refer to the response limits indicated in the specifications.

5. If record EQ adjustments are required, rotate the center core of L 2 (15 ips) and L 1 (7½ ips) up or down to compensate for high frequency pre-emphasis. Use R 105 (15 ips) and R 104 (7½ ips) trimmers to compensate for high frequency level variances. Use R 103 (15 ips) and R 102 (7½ ips) trimmers to compensate for middle and low frequency pre-emphasis.

6. Repeat this procedure for each of the remaining channels.

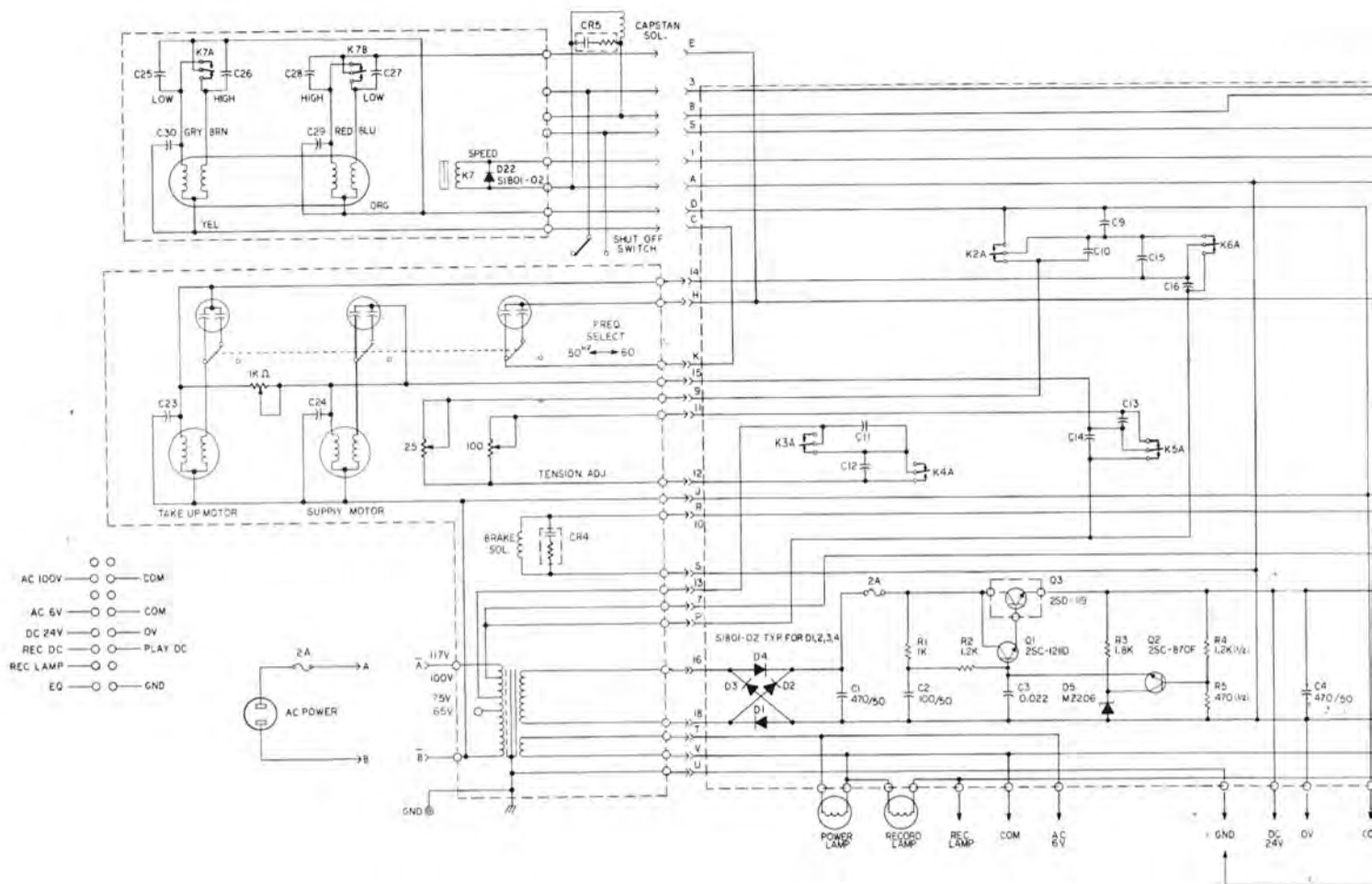


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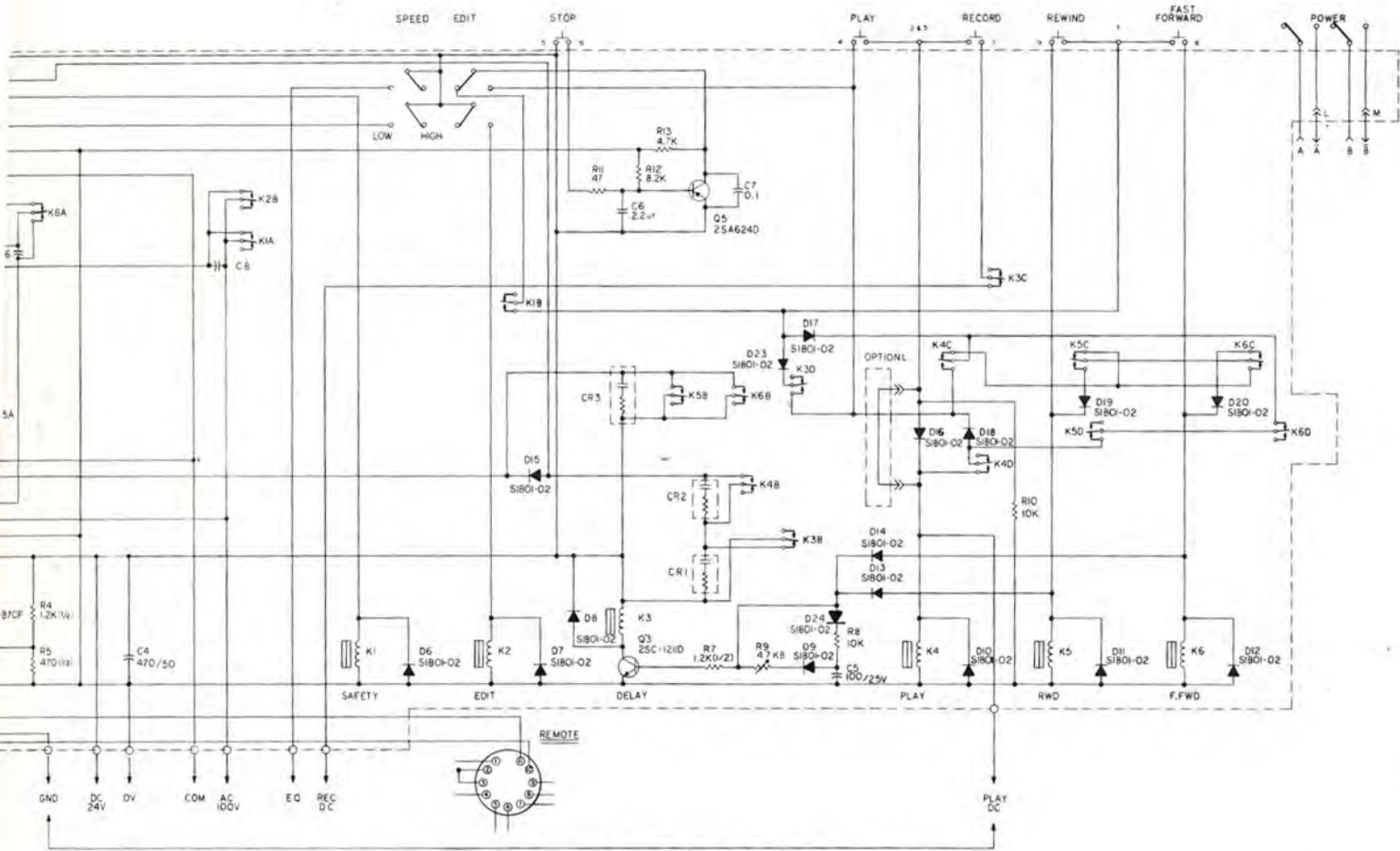


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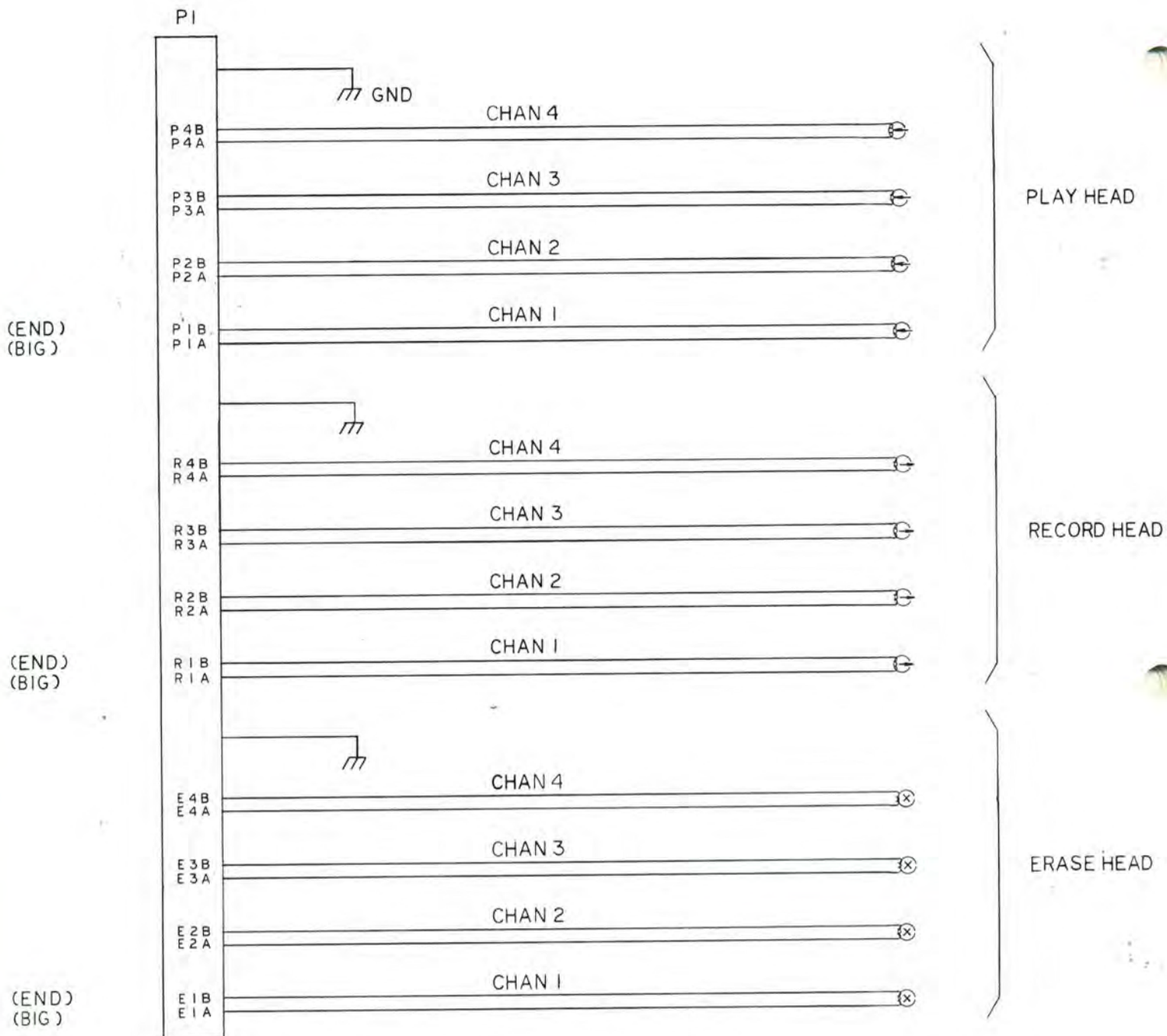
SERIES 70 1/4" TRANSPORT SCHEMATIC



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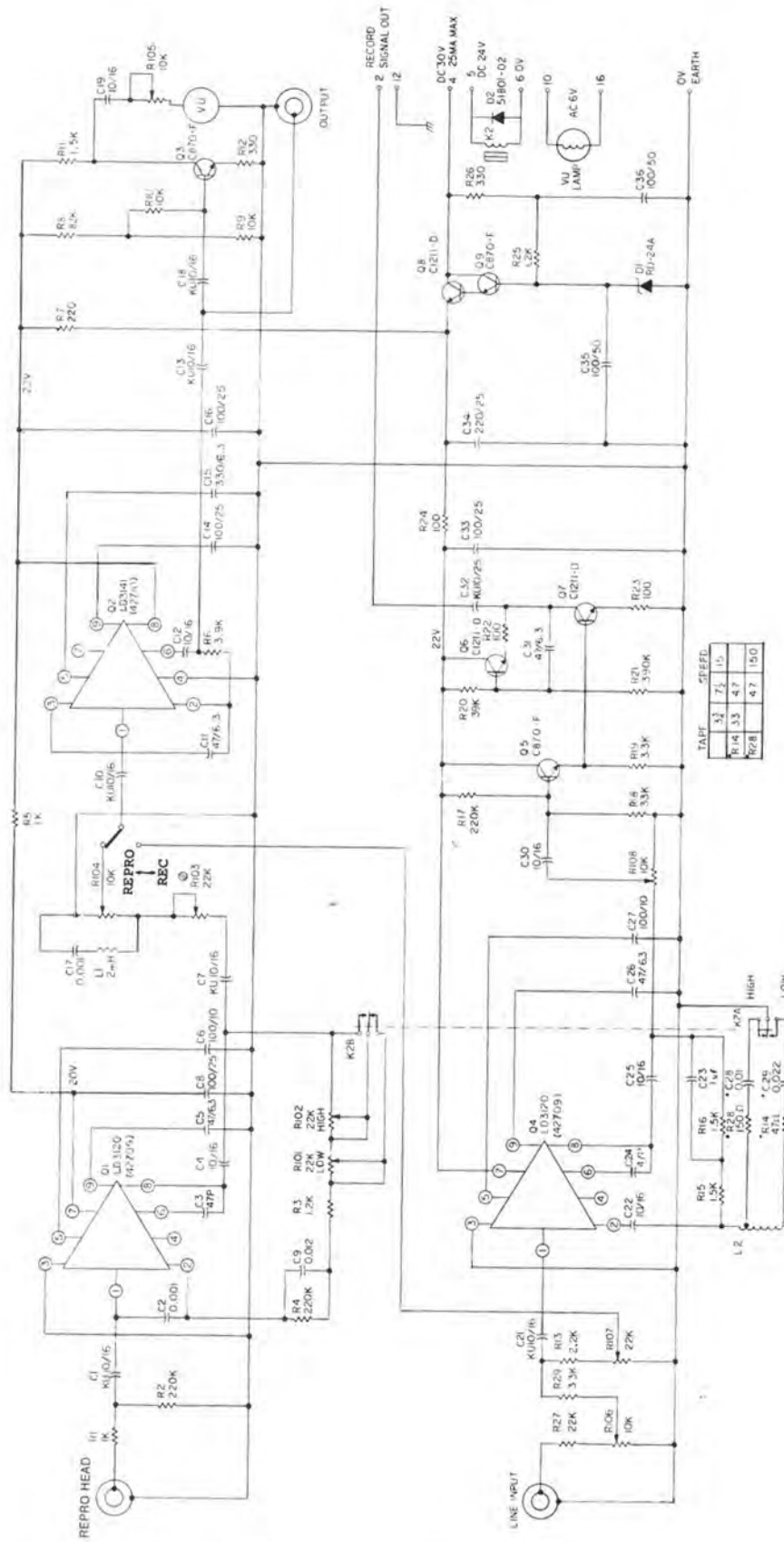


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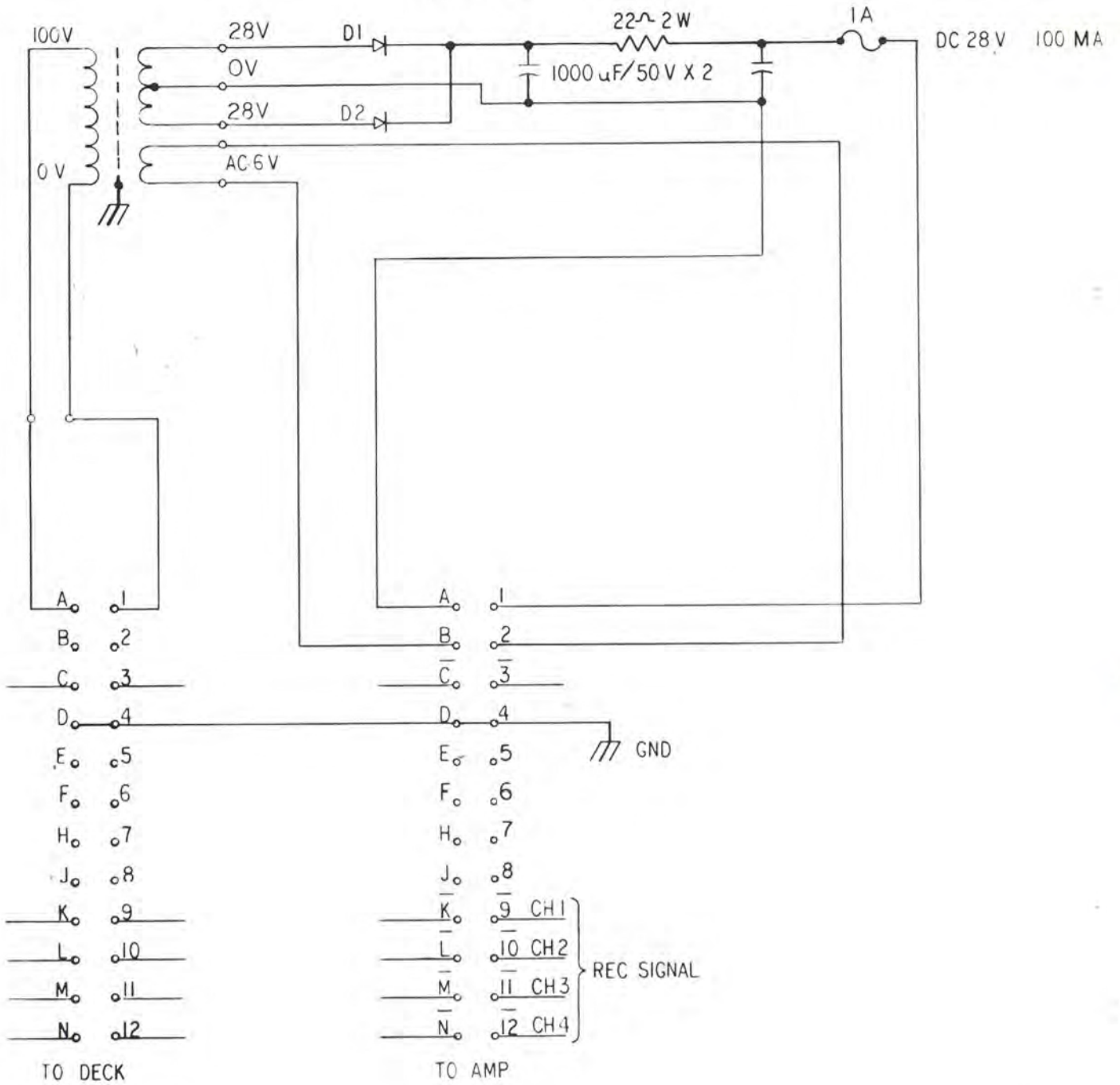
SERIES 70 HEAD NEST SCHEMATIC



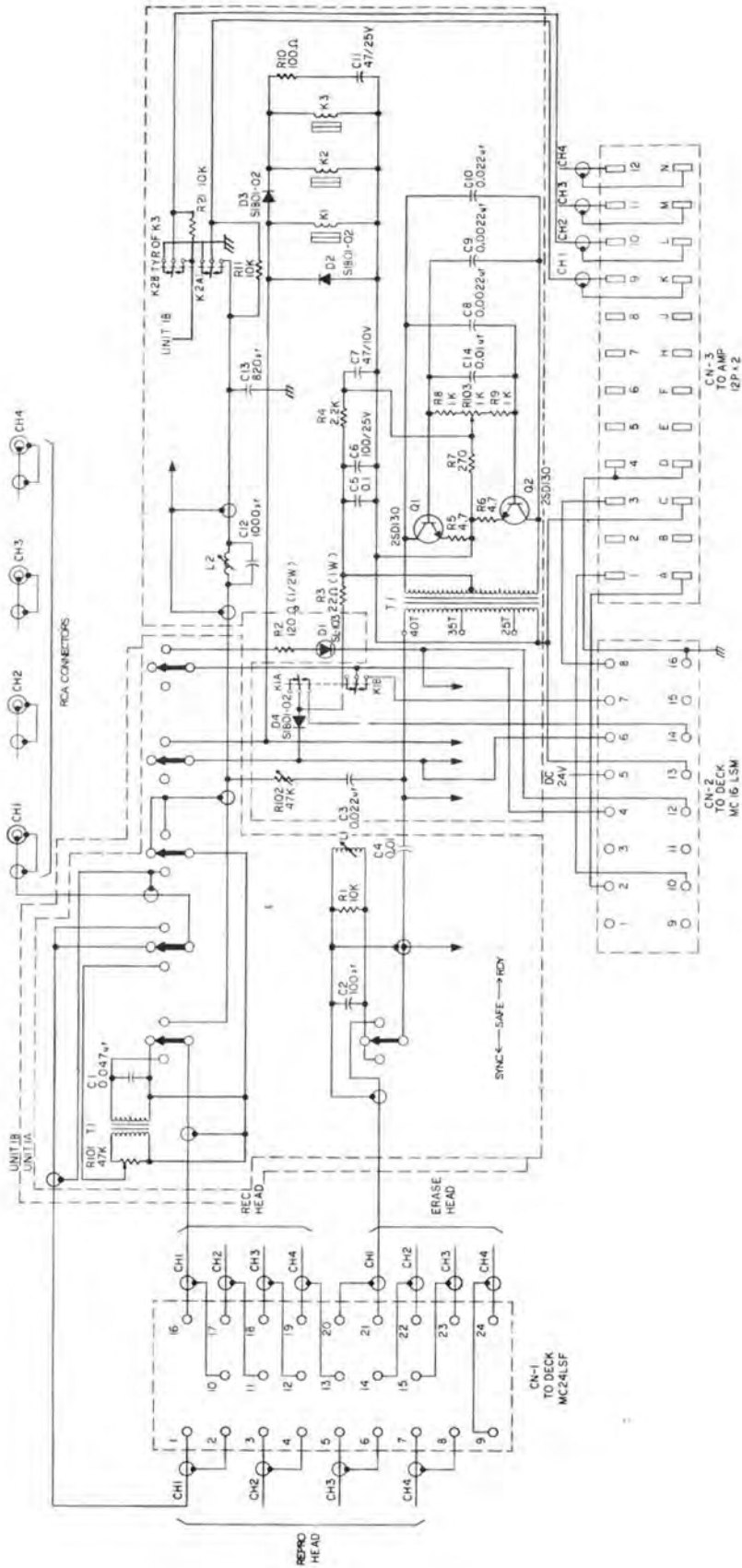
701 ELECTRONICS SCHEMATIC

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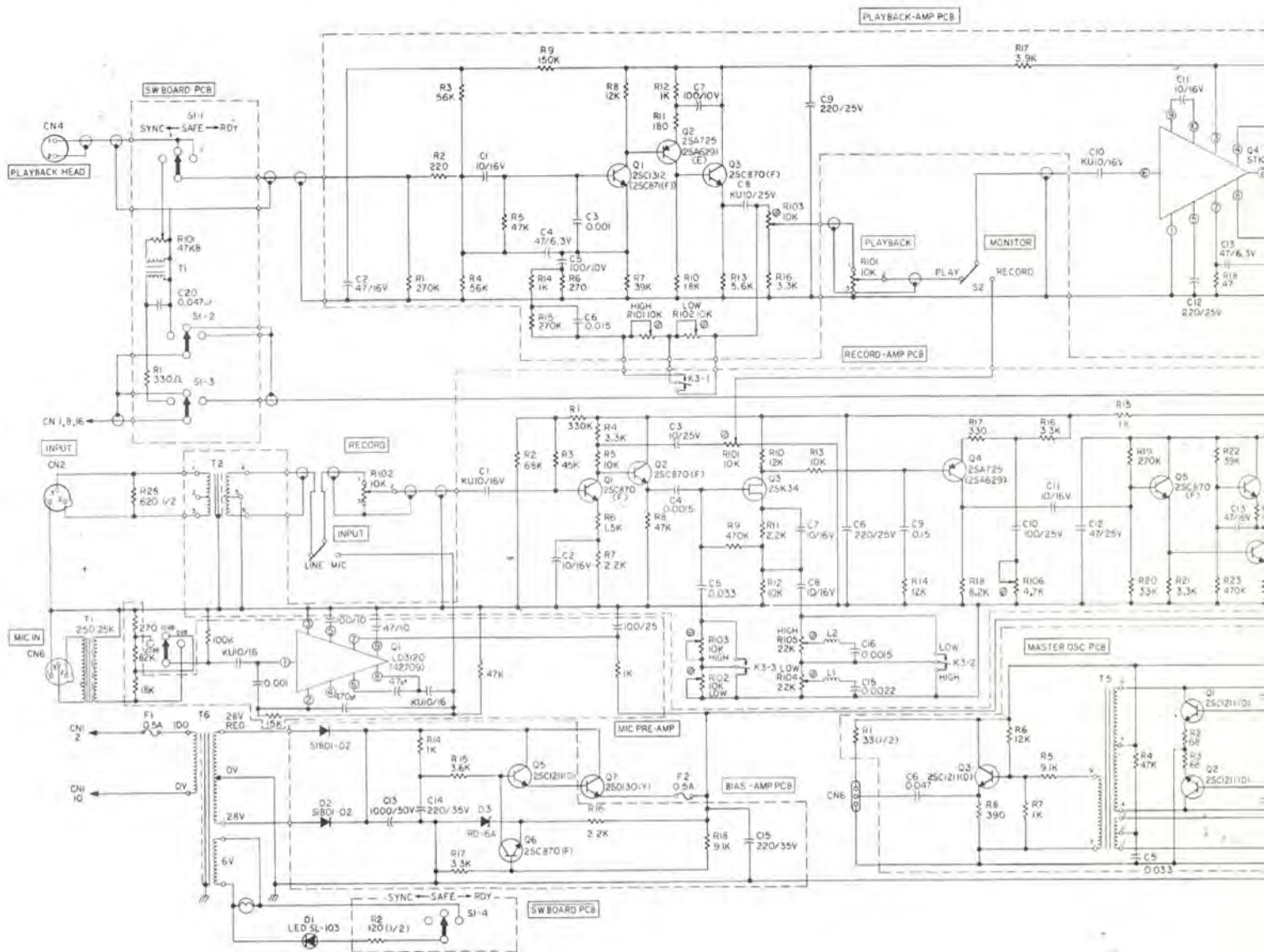


702 POWER SUPPLY SCHEMATIC

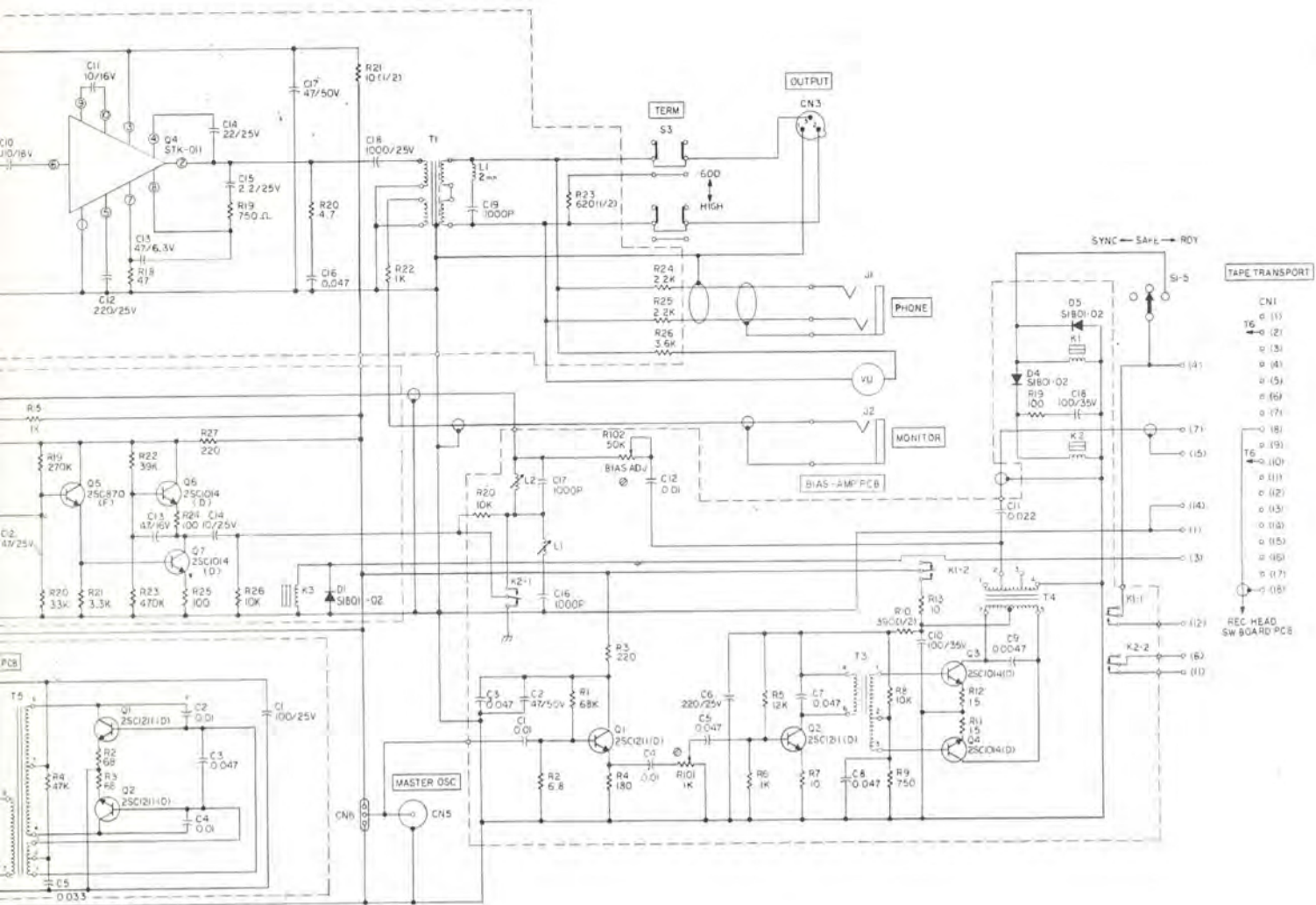


703 SYNC PANEL SCHEMATIC

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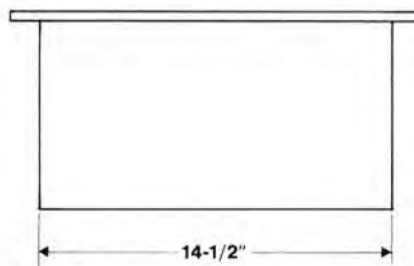
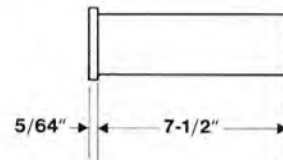
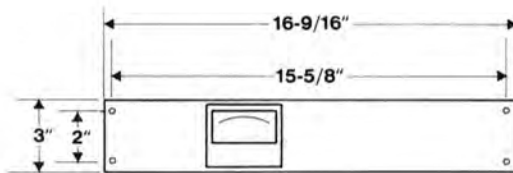
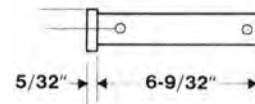
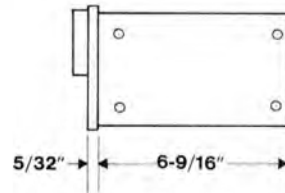
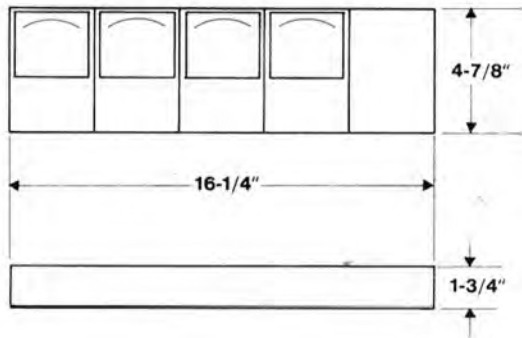
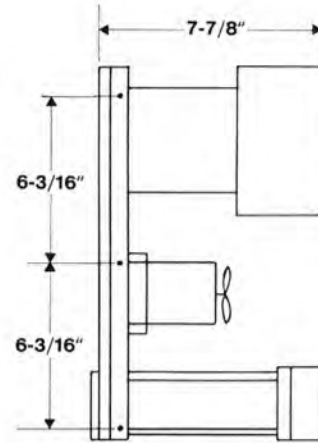
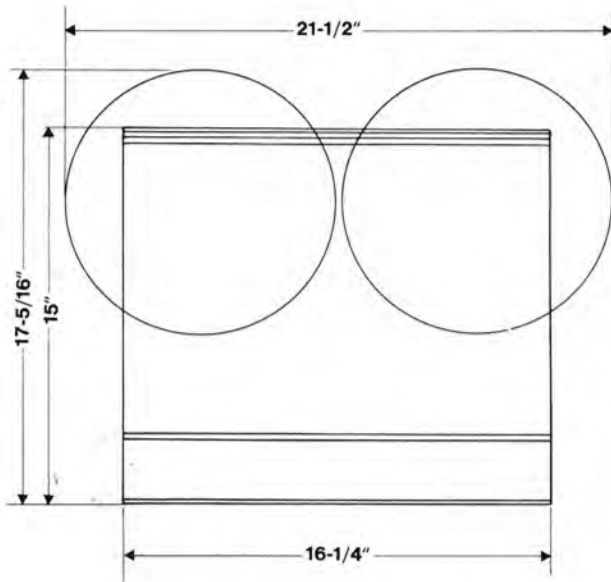


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SERIES 70 SPECIFICATIONS

All Series 70 specifications based on use of 3M #206 tape

FREQUENCY RESPONSE: Reproduce & Overall	40 Hz-18 kHz ± 2 dB at 15 ips 40 Hz-15 kHz ± 2 dB at 7½ ips	
SIGNAL-TO-NOISE RATIO, Overall (Referenced to peak record level)	Full Track:	greater than 65 dB, WTD greater than 56 dB, UNWTD
	Half Track:	greater than 63 dB, WTD greater than 54 dB, UNWTD
INSTANTANEOUS SPEED VARIATION: (Measured with calibrated flutter tape)	0.05% WTD RMS (NAB) at 15 ips 0.07% WTD PEAK (ANSI) at 15 ips 0.08% WTD RMS (NAB) at 7½ ips 0.15% WTD PEAK (ANSI) at 7½ ips	
CROSSTALK:	Overall: 50 dB at 1 kHz channel to channel 48 dB at 100 Hz	
DISTORTION: Record and Reproduce (without tape)	Less than 0.5% THD at +10 VU	
SPEED ACCURACY: (through 3600 feet)	99.5%	
EQUALIZATION:	NAB	
ERASURE: (400 Hz at +10 VU reference)	Greater than 65 dB	
RECORD LEVEL CALIBRATION:	Referenced to 185 nWb/m	
	501 ELECTRONICS	701 ELECTRONICS
INPUT IMPEDANCE:	Mic: Nominal 200 Ohms, balanced or unbalanced Line: 600 Ohms, balanced or unbalanced	Mic: None Line: 50K Ohms, unbalanced
LINE OUTPUT LEVEL:	+4 dBm (adjustable)	Nominal .3 V RMS (-10 dB), unbalanced; into 10K Ohms or higher
HEADROOM (without tape):	20 dB over rated output level	
HEADPHONE OUTPUTS:	3-circuit jack, 600 Ohms, balanced	None
POWER REQUIREMENTS:	117 V AC; 60 Hz; nominal 200 W	



SERIES 70 DIMENSIONS

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